RUTIN AND ITS POTENTIAL ROLE IN MANAGING DIABETES

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Abstract - Diabetes mellitus continues to pose a serious global health concern, with its prevalence steadily increasing and complications arising from poor blood sugar control remaining a persistent burden. Alpha-glucosidase inhibitors are important in maintaining post-meal glucose levels by delaying the breakdown of carbohydrates. However, commonly used synthetic options such as acarbose and miglitol often lead to gastrointestinal discomfort and inconsistent tolerance among patients. These drawbacks have encouraged greater attention toward natural alternatives, especially flavonoids like rutin, a flavonol glycoside made up of quercetin and rutinose, commonly found in foods such as buckwheat, citrus fruits, and apples.This review brings together findings from research conducted between 2014 and 2024, highlighting rutin's strong potential as a natural alpha-glucosidase inhibitor for diabetes management. Evidence from in vitro, in vivo, and early clinical studies suggests that rutin can effectively reduce postprandial glucose levels while offering antioxidant and pharmacological benefits. Compared to synthetic inhibitors, it also shows a more favorable safety profile. Despite these advantages, several obstacles remain, including low bioavailability, limited stability, and a lack of comprehensive human studies. Overcoming these barriers through improved formulations such as nano-delivery systems and by combining rutin with established anti-diabetic drugs could significantly enhance its therapeutic value. Advancing rutin's application requires a multidisciplinary effort that bridges pharmacology, formulation science, and clinical research. With further development, this natural compound holds real promise as a safe and effective option for managing diabetes.

Keywords - Rutin; In Vitro; In Vivo; Nano Delivery Systems; Alpha-Glucosidase Inhibitor